

Dengue

(Also known as Dengue Fever,
Dengue Hemorrhagic Fever and Breakbone Fever)

December-2003

1) THE DISEASE AND ITS EPIDEMIOLOGY

A. Etiologic Agent

Dengue fever (DF) and dengue hemorrhagic fever (DHF) are caused by the same four serotypes of dengue flaviviruses (serotypes 1, 2, 3 and 4).

B. Clinical Description and Laboratory Diagnosis

DF is an acute, viral illness characterized by sudden onset of fever, severe headache, eye pain, muscle and joint pain, and rash. GI upset and loss of appetite often occur. Swollen lymph nodes, petechiae, nosebleeds and bleeding gums also occur frequently. Recovery is often associated with prolonged fatigue and depression. DHF is a severe viral illness also characterized by sudden onset of fever as well as hemorrhaging. DHF is associated with abnormal blood clotting, low platelet count (thrombocytopenia), and evidence of increased vascular permeability (plasma leaking through capillaries). Patients with GI bleeding have a greater likelihood of dying. Dengue shock syndrome includes more severe cases of DHF when patients also have life-threatening reduced blood pressure (hypotension). Fatalities associated with DF are rare. With DHF, case-fatality ratios without treatment have reached 50%, although with intensive supportive treatment, rates are much lower (1–2%).

Laboratory diagnosis is based on serological tests and virus isolation. Haemagglutination-inhibiting antibodies techniques (HI), complement fixation (CF), ELISA and neutralization tests are used. Virus can be isolated from the blood by inoculation of mosquitoes or cell cultures.

C. Reservoirs

In tropical urban centers, the viruses that cause DF and DHF are maintained in humans and mosquitoes. In parts of Southeast Asia and West Africa, the viruses are maintained in monkeys and mosquitoes.

D. Mode of Transmission

DF and DHF viruses are transmitted to humans by infected mosquitoes, principally *Aedes aegypti*. Other *Aedes* species also play a role in transmission. These viruses are not transmitted directly from person-to-person.

E. Incubation Period

The incubation period is usually 4 to 7 days, although it may range from 3 to 14 days.

F. Period of Communicability or Infectious Period

The diseases DF and DHF are not communicable from person-to-person. People are considered infectious to mosquitoes from a few days before onset to the end of the febrile period, usually about 3–5 days. The mosquito becomes infective 8–12 days after a blood meal from an infected person or monkey, and it remains infective for its lifetime.

G. Epidemiology

DF and DHF are endemic in most tropical countries, including those in Asia, Australia, Africa, the Caribbean, Central America and South America. Epidemics occur wherever the vectors are present and virus is introduced. Mosquito vectors are present in the United States. Cases were reported in Texas in 1980, 1986, 1995 and 1997. In 1997, 56 imported laboratory-positive cases of DF or DHF were diagnosed at the Centers for Disease Control and Prevention (CDC) Dengue Branch. In addition, 3 locally acquired cases were diagnosed in residents of Texas. DHF occurs more frequently in children. In New Jersey, DF and DHF are imported diseases, and any cases in the state are probably due to recent travel abroad. *Aedes albopictus*, a potential vector of DF and DHF, has been established in New Jersey since 1995. There has been no evidence of local

transmission of DF or DHF by this mosquito in the U.S. to the present time. One to 2 cases of travel-related dengue fever are reported annually to the NJDHSS.

2) REPORTING CRITERIA AND LABORATORY TESTING SERVICES

A. New Jersey Department of Health and Senior Services (NJDHSS) Case definition CASE CLASSIFICATION

A. CONFIRMED

A clinically compatible case, **AND**:

- Isolation of dengue virus from serum and/or autopsy samples, **OR**
- Demonstration of fourfold or greater rise or fall in reciprocal immunoglobulin G (IgG) or M (IgM) antibody titers to one or more dengue virus antigens in paired serum samples, **OR**
- Demonstration of dengue virus antigen in autopsy tissue or serum samples by immunochemistry or by viral nucleic acid detection methods.

B. PROBABLE

A clinically compatible case, **AND**:

- Demonstration of reciprocal IgG antibody titer equal to or greater than 1:1280, or positive IgM antibody test on a single acute or convalescent-phase serum specimen to one or more dengue virus antigens.

C. POSSIBLE

Not used.

B. Laboratory Testing Services Available

The Public Health and Environmental Laboratories (PHEL) do not provide testing of clinical specimens for dengue virus. However, arrangements can be made for sample testing by the CDC through the PHEL Virology Laboratory. Please contact the Virology Laboratory at 609.984.2622 before samples are submitted to obtain information regarding appropriate specimen types and specimen transport instructions.

3) DISEASE REPORTING AND CASE INVESTIGATION

A. Purpose of Surveillance and Reporting

- To identify imported cases and better understand the epidemiology of endemic and epidemic DF and DHF.
- To ensure that cases are appropriately contained and prevent the introduction of virus into native mosquito populations.
- To identify locally acquired cases, if they occur, so that appropriate active surveillance and mosquito control interventions can be taken.
- To provide travelers with appropriate preventive health information.

B. Laboratory and Healthcare Provider Reporting Requirements

The New Jersey Administrative Code (N.J.A.C. 8:57-1.8) stipulates that laboratories report (by telephone, confidential fax, over the Internet using the Communicable Disease Reporting System [CDRS] or in writing) all cases of dengue to the local health officer having jurisdiction over the locality in which the patient lives, or, if unknown, to the health officer in whose jurisdiction the health care provider requesting the laboratory examination is located. The health care providers must report all cases of dengue to the local health officer having jurisdiction over the locality in which the patient lives.

C. Local Board of Health Reporting and Follow-Up Responsibilities

1. Reporting Requirements

The New Jersey Administrative Code (N.J.A.C. 8:57-1.8) stipulates that each local health officer must report the occurrence of any case of dengue, as defined by the reporting criteria in Section 2 A above. Current requirements are that cases be reported to the NJDHSS Infectious and Zoonotic Diseases Program (IZDP) using the [CDS-1 form](#). A report may also be filed electronically over the Internet using the confidential and secure CDRS.

2. Case Investigation

- a. It is the local health officer's responsibility to complete the [CDS-1 form](#) by interviewing the patient and others who may be able to provide pertinent information. Much of the information required on the form can be obtained from the patient's healthcare provider or the medical record.
- b. Most of the information required on the form can be obtained from the medical provider or the medical record. Use the following guidelines in completing the form:
 - 1) Record "Dengue" as the disease being reported.
 - 2) Record the patient's demographic information.
 - 3) Record the date of onset, symptoms (fever, headache, muscle pain, rash), date of diagnosis, hospitalization information (if applicable), and outcome of disease (*e.g.*, recovered, died).
 - 4) Exposure history: use the incubation period range for DF, DHF, and dengue shock syndrome (3–14 days). Specifically, focus on the period beginning a minimum of 3 days prior to the patient's symptom(s) onset date back to no more than 14 days before onset for the patient's travel history:
 - a. Determine the specific date(s) and geographic area(s) visited by the case-patient to identify where he/she may have become infected.
 - b. Ask about possible mosquito bites.
 - c. If unsure, state "Unknown."
 - d. This information can be recorded in the "Comments" section at the bottom of the form.
 - 5) Include any additional comments regarding the patient in the "Comments" section.
 - 6) If there have been several attempts to obtain patient information (*e.g.*, the patient or healthcare provider does not return calls or respond to a letter, or the patient refuses to divulge information or is too ill to be interviewed), please fill out the form with as much information as possible. Please note on the form the reason why it could not be filled out completely. **If CDRS is used to report, enter collected clinical information into the "Comments" section.**

After completing the form, it should be mailed (in an envelope marked "Confidential") to the NJDHSS IZDP, or the report can be filed electronically over the Internet using the confidential and secure CDRS. The mailing address is:

NJDHSS
 Division of Epidemiology, Environmental and Occupational Health
 Infectious and Zoonotic Diseases Program
 P.O.Box 369
 Trenton, NJ 08625-0369

- c. Institution of disease control measures is an integral part of case investigation. It is the local health officer's responsibility to understand, and, if necessary, to institute the control guidelines listed below in Section 4, "Controlling Further Spread."

4) CONTROLLING FURTHER SPREAD

A. Isolation and Quarantine Requirements (N.J.A.C. 8:57-1.10)

Since DF and DHF are not transmitted person-to-person, there are no restrictions for case-patients or contacts of case-patients. Blood precautions are advised. To prevent local spread, patients should avoid exposure to mosquitoes until fever subsides. See 4B below.

B. Protection of Contacts of a Case

It is important to prevent mosquitoes from biting patients until their fever subsides. Mosquitoes can be controlled by screening sickrooms, spraying with insect repellent and using bed nets. These measures can prevent transmission of dengue fever from patients to mosquitoes.

Note: The *Ae. aegypti* mosquito has not been found in New Jersey in recent years. Another potential vector, *Ae. albopictus*, is present in the state. Concerns over local transmission should be small.

C. Managing Special Situations

Locally Acquired Case

As noted above in Section 4B, a locally acquired case of dengue would be an unusual occurrence, as the *Ae. aegypti* mosquito has not become established in New Jersey. But if a local health officer determines during the course of an investigation that a patient does not have a recent travel history to an endemic country, environmental measures such as investigating local areas visited by the patient, in cooperation with state and county mosquito control agencies, to locate the focus of infection, and surveillance of other people for illness may be necessary. Additional mosquito control measures may be necessary if there is evidence that *Ae. albopictus* may have been responsible for a case of locally acquired dengue.

Reported Incidence Is Higher Than Usual/Outbreak Suspected

Outbreaks can occur wherever vectors are present and virus is introduced. These outbreaks can be extensive and affect a large number of people. If an outbreak is suspected, investigate to determine source of infection and mode of transmission. A common exposure to or an association with *Ae. aegypti* mosquitoes (*e.g.*, travelers returning from endemic countries) should be sought and applicable preventive or control measures should be instituted. *Ae. albopictus* should be suspected as the vector of a locally acquired case of dengue.

For either situation, contact the NJDHSS Infectious and Zoonotic Diseases Program as soon as possible. The Program staff can help determine a course of action to prevent further cases and can perform surveillance for cases that may cross several jurisdictions and therefore be difficult to identify at a local level.

D. Preventive Measures

International Travel

Since epidemics of dengue can be extensive and may affect a high percentage of the population, travelers should avoid areas with ongoing epidemics. However for those who do travel to endemic areas, it is recommended that:

- Travelers protect themselves from mosquitoes by using insects repellents, wearing protective clothing and using mosquito nets when rooms are not screened. Unlike other vectors, the *Ae. aegypti* mosquitoes bite during daytime hours.
- Recent travelers to endemic countries with acute onset of fever and other compatible symptoms should seek medical attention immediately.

For more information regarding international travel and dengue, contact [the CDC's Traveler's Health Office](http://www.cdc.gov/travel) at 877.394.8747 or through the Internet at <<http://www.cdc.gov/travel>>.

ADDITIONAL INFORMATION

A [*Dengue Fever Fact Sheet*](http://www.state.nj.us/health) can be obtained at the NJDHSS website at <www.state.nj.us/health>.

The CDC surveillance case definition for dengue fever is the same as the criteria outlined in Section 2A of this chapter. CDC case definitions are used by state health departments and CDC to maintain uniform standards for national reporting. For reporting to the NJDHSS, always refer to the criteria in Section 2A.

REFERENCES

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